Town of Hampton

December 7, 2016

Collis Adams
Wetlands Program
NHDES Wetlands Bureau
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

Re: Bicentennial Seawall – Hampton, New Hampshire

Dear Collis;

The Town of Hampton has contracted the engineering services of Tighe and Bond Inc, out of Portsmouth, New Hampshire to conduct a condition assessment of the Bicentennial Park Sewall located adjacent to the State's seawall at the end of High Street. Based on the preliminary results of this investigation, the Town of Hampton has temporarily closed off Bicentennial Park and the Seawall from further access due to concerns related with the walls stability. The area has been posted with no trespassing signs.

The town is actively pursuing temporary measures to protect the existing wall, as well as permanent corrective actions. We have reached out to contractors to request contracts to provide emergency services as well as our engineer to determine what, if any, immediate action should occur.

We have attached a copy of the preliminary report and will keep you updated as new information is obtained. In the event of any failure, we would request the support of your department and of those included on this correspondence. Please call the Department of Public Works if there are any questions or concerns at 603-926-3202.

Yours Truly,

Chris Jacobs, P.E.
Director Hampton of Public Works

Jennifer Hale, P.E.
Deputy Director Department of Public Works

CC: Fred Welch, Town Manager
Jamie Sullivan. Assistant Town Manager
Board of Selectman
Richard Sawyer, Police Chief and Local Emergency Management Director
Victoria Sheehan, Commissioner NHDOT
Brian Schutt, NHDOT District 6
Jeffery Rose, Commissioner DRED
U.S. Coast Guard First District
FEMA Region 1

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Bicentennial Park Seawall: Interim Stabilization Options
Town of Hampton

TO: Jennifer Hale, P.E., Hampton DPW
Deputy Director - Public Works Department

FROM: Duncan Mellor, P.E.
Principal Coastal Engineer

DATE: December 5, 2016

Tighe & Bond has investigated the Bicentennial Park Seawall per Tasks 3 and 4 of our September 26, 2016 contract with the Town of Hampton. As a result of our work we have found the seawall has shallow embedment into the beach and the seawall is supported on sand prone to storm erosion.

We reviewed the June 13, 1950 archive drawing from the US Coast Guard, titled *Seawall Repairs*, which indicates the seawall has no real footing. The seawall repair completed by the Coast Guard circa 1950 indicates the seawall cross section is narrow and comprised of 1950's concrete over an older smaller concrete seawall that currently is in very poor condition (see seawall concrete test report).

On October 13, 2016 we witnessed 3 subsurface test borings, in which we found primarily sand soils below the seawall, with bedrock about 11 to 17 feet below the bottom of seawall.

Nine test pit excavations were performed October 11, 2016 in front and behind the seawall. The purpose of the test pits was to determine the accuracy of the 1950 Coast Guard drawing, depth of sand along seawall and if there was revetment present. The test pits excavated at the toe of wall showed there was approximately 2 feet of seawall embedment into the beach. The southwestern length of seawall adjacent to the state seawall has some stone revetment beach armoring, while the rest of the beach along the seawall has fewer armor stones and some concrete debris that provides limited scour protection.

A site visit on December 5, 2016 showed a lower beach level by about one foot, with additional stone revetment and concrete debris exposed. Exposed seawall height was measured along the wall and comparison to archive design details and prior test pit measurements indicates seawall embedment has been reduced to generally about one foot.

Very high tides with waves breaking over the seawall did occur around October 18 and November 16, which likely caused some beach scour at the seawall, however these were low wind conditions and storm events may increase beach scour.

Photo 1: Seawall on October 11, 2016

Photo 2: Seawall wave overtopping on November 16, 2016

Photo 3: Seawall and beach on December 5, 2016

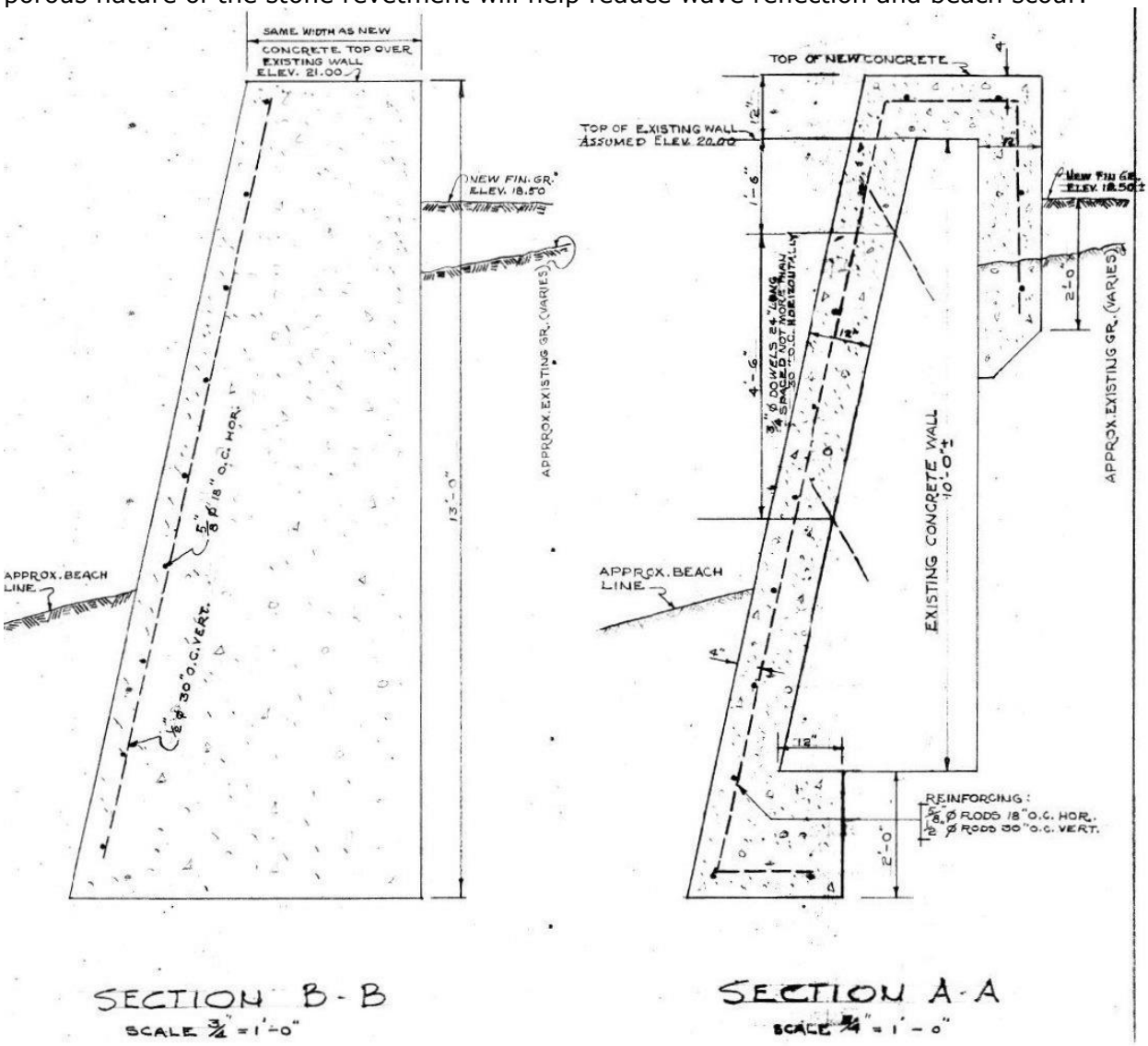
Photo 4: Seawall and beach on December 5, 2016 with footing exposed and typical seawall embedment of about one foot based on exposed wall height measurements

With the lower level of the beach sand, concrete debris on the beach is visible and appears to be a failed length of the prior seawall over three panels of wall with the 1950's repair overlay visible in the concrete debris on the beach. These observations suggest approximately 100 linear feet of seawall previously collapsed onto the beach after the 1950's repairs and was replaced prior to the survey benchmark being installed about 1980 (benchmark data sheet).

For the seawall study we ran a number of computer model stability checks on the existing seawall for multiple load combinations under various water level conditions with the 2 feet of embedment observed in October 2016. Under dry conditions the seawall had acceptable stability, but with somewhat low factors of safety during seismic loading. With groundwater levels at the bottom of wall footing for both the beach and backfill, the factors of safety are slightly lower and at failure during seismic loading. For higher groundwater levels in the backfill the factors of safety drop and the seawall becomes unstable. The existing seawall also would be expected to fail under severe storm wave loadings (design wave conditions).

As has been recently demonstrated, this seawall does get overtopped by waves, raising the backfill groundwater level, surcharging the wall with added laterals loads. It should be anticipated that the existing seawall can fail due to beach scour, backfill scour, water surcharge or storm wave loading. A failure of this seawall would be expected to result in significant erosion of the back berm sand soils and dune area behind the wall. Route 1A, High Street and the neighborhood are lower than the seawall and back berm, and would be prone to storm damage and erosion if the seawall failed during a storm of sufficient duration to breach the back berm and dune. The existing beach slope if extended inland at the same slope would reach Route 1A.

Interim stabilization of the seawall is recommended with at least a minimal stone revetment repair adding armor stone to the revetment, extending out from the existing seawall face 16 feet with at least 5-ton armor stone to buttress the seawall. This stone would be reset and reused with any of the recommended seawall repair or replacement alternatives and it would be part of the longer term fix. The stone is a natural material consistent with the existing shoreline and adjacent state seawall and revetment. The stone revetment would be set in a step-like manner to reduce wave runup, and the porous nature of the stone revetment will help reduce wave reflection and beach scour.



Archive seawall details from 1950 USCG drawing

Local Rock Suppliers:
Aggregate Industries – Raymond, NH Quarry
781-941-7200
Closes for the winter, union operation can be a problem loading

Brox Industries – Rochester NH Quarry
Dave Cluff dcluff@broxindustries.com
(603) 332-4262
Deepening the quarry, can load, the source of rock for N. Hampton project

Pike Industries – quarries in Eliot ME & Wells ME
Brad Deans, Aggregate Sales / Estimator
Office: 603-436-4432 ext. 77227
Cell: 603-520-5819
Have big stone available now, budget price $15/ton at the quarry not loaded

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Bicentennial Park Seawall, Hampton, NH – Test Pit Logs

TO: Jennifer Hale, P.E., Town of Hampton,
Chris Jacobs, P.E., Town of Hampton

FROM: Tristan Donovan, E.I.T., Tighe & Bond, Inc.

COPY: Duncan Mellor, P.E., Tighe & Bond, Inc.

DATE: November 21, 2016

On October 11, 2016, Tighe & Bond, Inc. was on site to observe test pits used to investigate the existing seawall. The plan titled "Subsurface Investigation Location Plan" attached to this memo shows the locations of the test pits and the borings. The boring logs and a plan titled "Hampton Beach L.B. Station Sewall Repairs" by the U.S. Coast Guard dated June 13, 1950 are also attached to this memo. The following summarizes the test pit observations.

Test Pit #1

Test Pit #1 is located to the southwestern end of the seawall, between the seawall and the asphalt parking area. This test pit was dug to attempt to locate a return wall that was shown to be removed on a plan from 1950 by the U.S. Coast Guard. The test pit was dug to approximately 6' and no return wall was found, confirming removal shown on the U.S. Coast Guard plan. The backfill was noticed to be a structural gravel backfill consisting of small 3"-4" sub-angular cobbles and fine to coarse grained sand and gravel (see Figure 1). This is consistent with the removal of an old section of wall, and backfilling the area that had previously been on the front side of the wall.

Figure 1: Test Pit #1 excavated backfill

Test Pit #2

Test pit #2 was dug to the northeast of the angled buttress wall that extends directly to the west of the inshore face of the seawall. This test pit was dug to attempt to locate an old concrete ramp that was used by the Coast Guard station that previously at this site. This ramp is shown on a plan from the U.S. Coast Guard dated 1950 along with two retaining walls on either side of the ramp. The test pit was dug to approximately 9' and the old concrete ramp and the second retaining wall were not found. A small 6" lip was observed 84" from the top of the wall which indicates the location of the removed ramp. This elevation is consistent with the footing that can be seen on the front side of the seawall and the newer looking concrete that filled in the gap made by the ramp (see Figure 2). It is

Figure 2: Old ramp footing and new concrete

unclear why one of the retaining walls was left in place. The excavated material was a gray fine to coarse sand.

Test Pit #3

Test Pit #3 is located on the ocean side of the seawall, to the northeast of the location of the old ramp. The test pit was dug until the toe of the seawall was uncovered at 22" below beach level, then, the soil under the seawall was dug out by hand to a point approximately 18" towards the back of the seawall. According to the U.S. Coast Guard plan form 1950, the overlay concrete extends away from the toe of the seawall towards land and has a small return. This was not observed in this test pit, but the U.S. Coast Guard plan is not clear on the distance this return extends. It is possible that it exists, just further than the 18" excavated. This test pit uncovered a 9" layer of gray beach sand on top of a layer of recent seaweed, indicating recent sediment transport resulting in 9" of sand accumulating in front of the wall (see Figure 3).

Figure 3: Sediment layers in Test Pit #3

Test Pit #4

Test Pit #4 was dug on the ocean side of the seawall, further to the northeast than Test Pit #3. The toe of the wall was observed at 36" depth. In addition, plastic sheeting was observed (see Figure 4) indicating a possible newer concrete repair.

Figure 4: Plastic sheeting in Test Pit #4

Test Pit #5

Test Pit #5 was dug on the ocean side of the seawall, towards the northeastern end. The test pit was dug at a transition between the overlay section and the new wall section according to the U.S. Coast Guard plan from 1950 (see Figure 5). The test pit was dug to approximately 8', with the toe of the seawall observed at 24" depth. Gray fine to coarse sand similar to the sand observed in other test pits was observed for the entire 8' depth.

Figure 5: Overlay section/new wall section transition

Test Pit #6

Test Pit #6 was dug on the land side of the seawall, at the northeast end where the wall meets the revetment stone. This test pit was dug to locate how far the revetment stone extended to the southwest under the beach sand. The test pit was dug to

approximately 7' and no revetment stone was observed beyond 15' from the northeast end of the wall.

Test Pit #7

Test Pit #7 was dug in line with the volleyball net posts, up against the land side of the seawall. The purpose of this test pit was to find the bottom of the overlay section as shown on the U.S. Coast Guard plan from 1950 and observed by Ross Engineering in a study performed in 2013. The test pit was dug to approximately 6', but the end of the overlay section was not observed.

Test Pit #8

Test Pit #8 was dug in the beach access ramp to the northeast of the site. This test pit was dug to observe the underlying materials and to see if there had been any armor stones placed under the beach sand. The largest stones observed were small to medium cobbles, no bigger than 6", under a 6" layer of beach sand and assess wave erosion potential. In a subsequent site visit, the area of Test Pit #8 had been scoured by wave action and 12"-18" rounded boulders were observed (see Figure 6). However, these stones did not seem to be placed as armoring stones, rather they seemed to be chinking stones used in the revetment to either side of the ramp that had migrated into the ramp section.

Figure 6: Area of Test Pit #8 after wave scour

Test Pit #9

Test Pit #9 was dug in the beach access ramp, closer to NH Route 1A than Test Pit #8. The soil observed in Test Pit #9 was similar to the soil observed in Test Pit #8. There were small to medium cobbles, no bigger than 6", under 6" of beach sand.

Attachments:

1. "Subsurface Investigation Location Plan", by Tighe & Bond, Inc., dated 11/21/2016
2. "Hampton Beach L.B. Station Seawall Repair", by U.S. Coast Guard, dated June 13, 1950
3. Boring Logs, by Tighe & Bond Inc., dated 10/13/16

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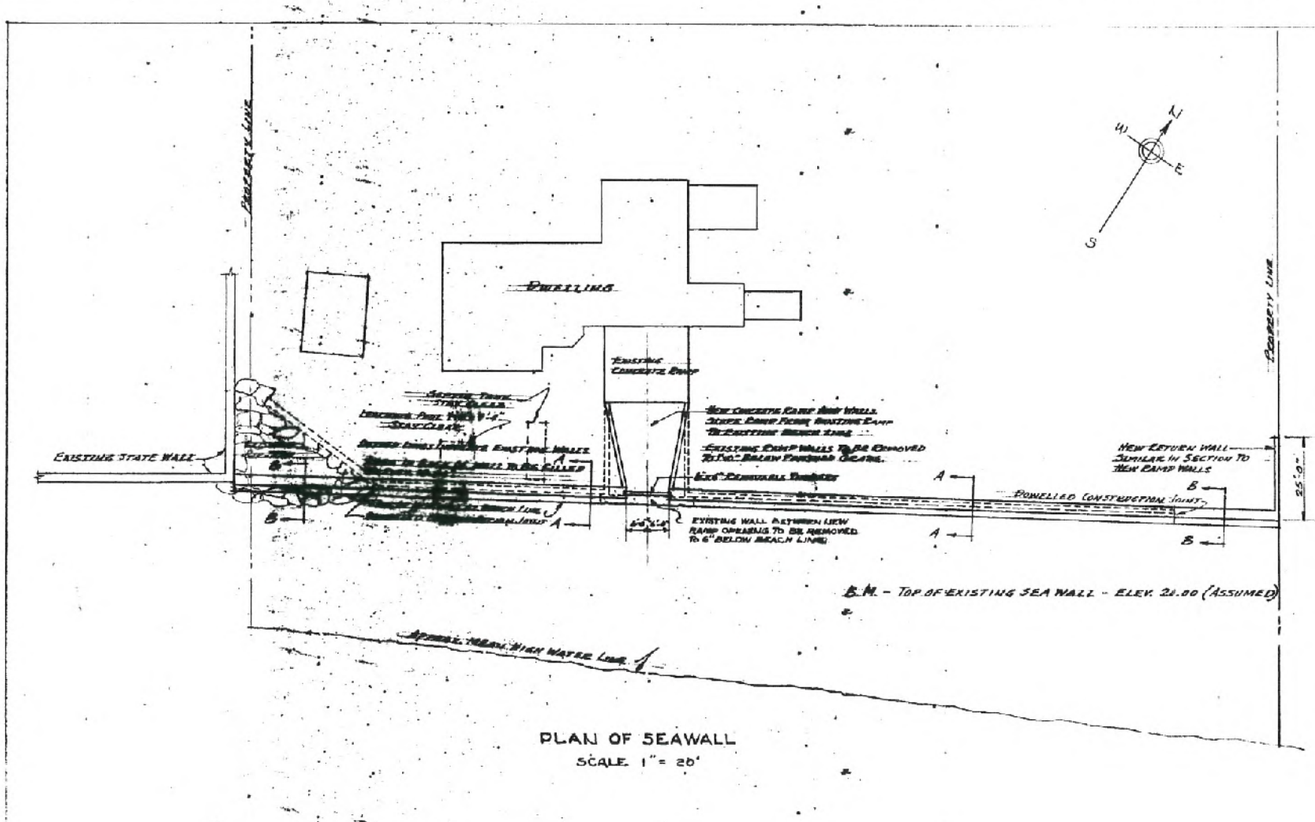
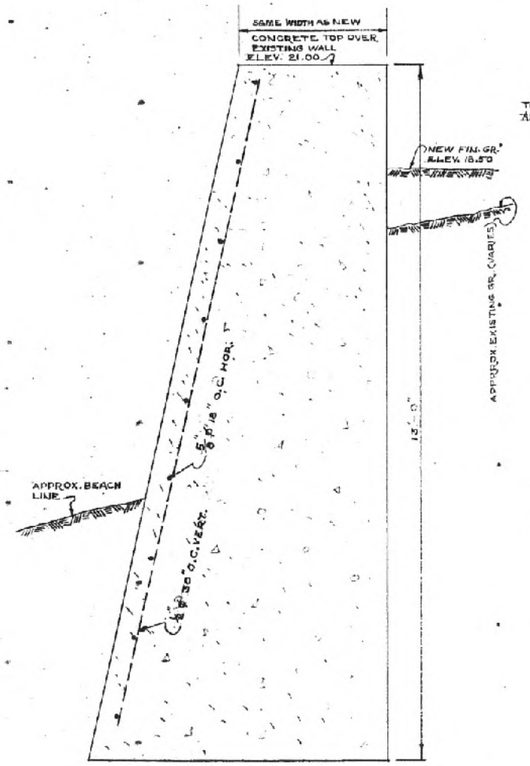
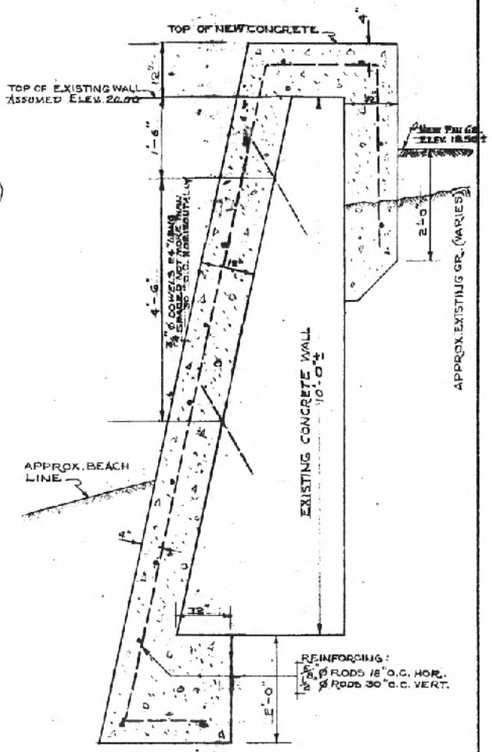


PLAN OF SEAWALL

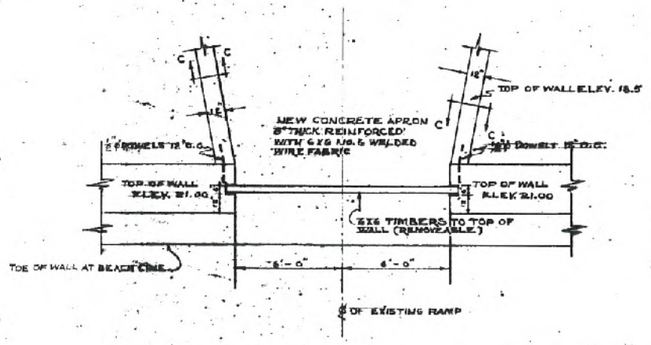
SCALE 1" = 20'





SECTION A-A

SCALE 3/4" = 1'-0"

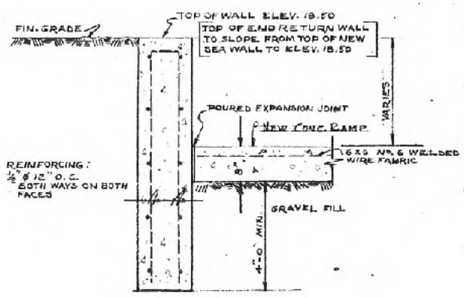


PLAN OF WALL AT RAMP

SCALE 1/4" = 1'-0"

SECTION B-B

SCALE 3/4" = 1'-0"



SECTION C-C

SCALE 3/4" = 1'-0"

REVISION	DATE	APPD.	BY

U. S. COAST GUARD — FIRST DISTRICT — BOSTON MASS.

CIVIL ENGINEERING

DESIGNED -
DRAWN - W.P.Jr.
TRACED
CHECKED J.C.R.

HAMPTON BEACH L.B.STATION
HAMPTON BEACH N.H.

SEAWALL REPAIRS

CHIEF OF SECTION

APPROVED
U.S.C.G. CHIEF OF DIVISION

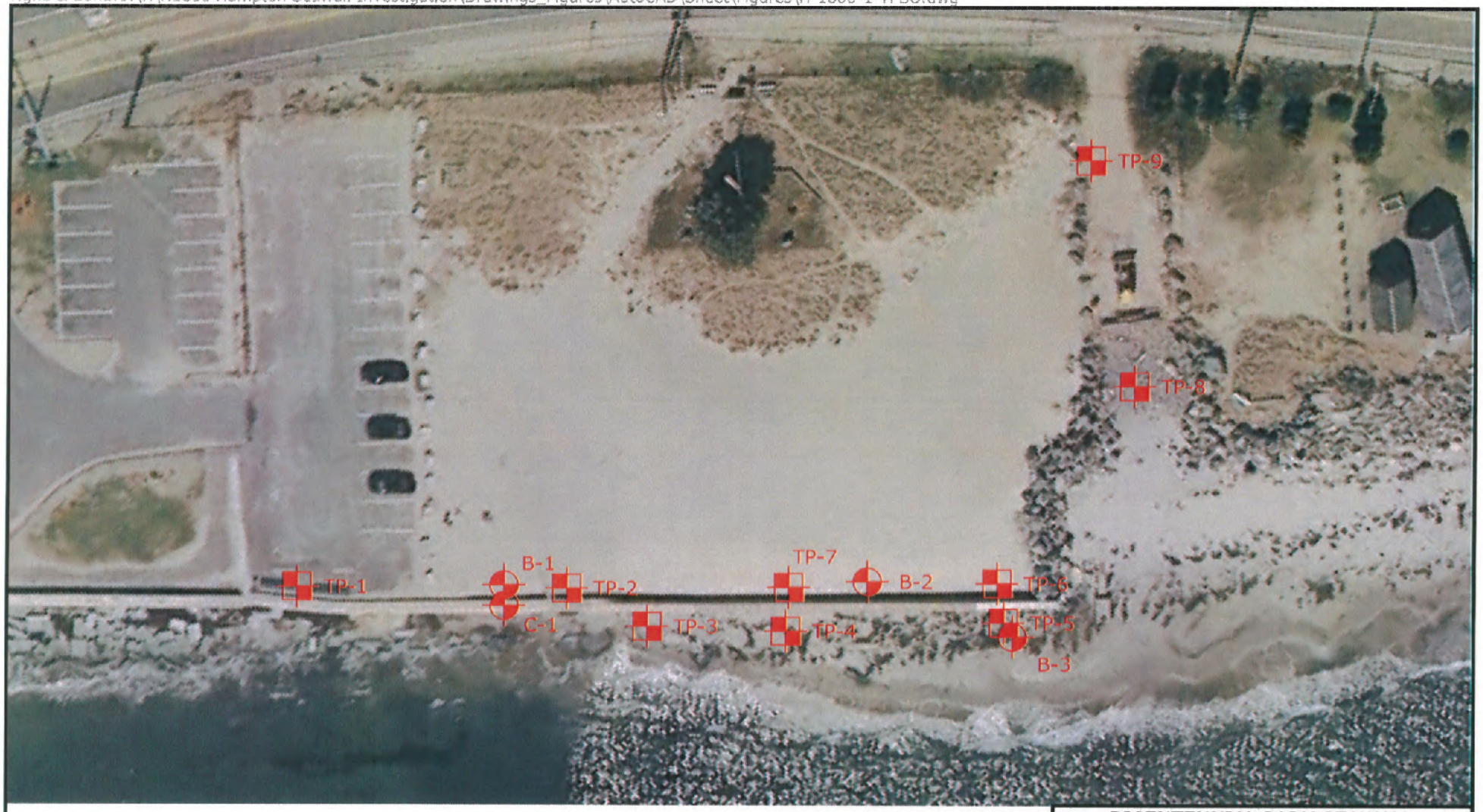
DATE JUNE 12, 1950

C. G. DRAWING NO.
4408

SCALE AS SHOWN SHEET 1 OF 1

ATTACHMENT A

Last Saved: 10/10/2016
Plotted On: Nov 21, 2016-11:22am By: TPD
Tighe & Bond: J:\H\H1800 Hampton Seawall Investigation\Drawings_Figures\AutoCAD\Sheet\Figures\H-1800-1-TPBO.dwg



LEGEND

B-1 BORING LOCATION

TP-1 TEST PIT LOCATION

50 0 25 50

SCALE: 1"=50'

N

BICENTENNIAL PARK SEAWALL
HAMPTON, NEW HAMPSHIRE

SUBSURFACE INVESTIGATION
LOCATION PLAN

DATE:	11/21/2016
SCALE:	AS SHOWN
FIGURE:	1 OF 1

Tighe&Bond
Engineers | Environmental Specialists

ATTACHMENT B

Tighe&Bond
Engineers | Environmental Specialists

Boring No. **B-1**
Page 1 of 1
File No. H-1800-1
Checked by: D. Brogan

Project: Bicentennial Park Seawall Investigation
Location: Hampton, NH
Client: Town of Hampton

Drilling Co.: New England Boring Contractors
Foreman: M. Soucy
T&B Rep.: T. Donovan
Date Start: 10/13/16 End: 10/13/16
Location See Exploration Location Plan
GS. Elev. 13.1' Datum: NAVD88

	Casing	Sampler
Type	HSA	Split Spoon
I.D./O.D.	4.25"/8.25"	1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Other		Safety Hammer

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time
See Note 1				

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1/12	0-2	1-2	Very loose, tan, fine SAND, trace Gravel			
				2-3				
		S-2/15	2-4	27-7	Medium dense, light brown, fine to medium SAND, trace Gravel			
				6-6				
5								
10							1	
		S-3/17	10-12	4-4	Loose, dark brown, fine SAND, trace Silt	SAND		
				5-6				
15								
		S-4/12	15-17	2-3	S-4: Loose, light gray, fine SAND, trace Silt			
		S-4A/5		2-5	S-4A: Loose, dark brown, fine to medium SAND, trace Silt			
20								
		S-5/11	20-22	7-6	S-5: Medium dense, dark brown, fine SAND, trace Silt			
		S-5A/11		4-9		20.9'		
					S-5A: Very stiff, gray-blue, Clayey SILT, trace Gravel, trace fine Sand	Clayey SILT		
					Bottom of Exploration at 23' due to auger refusal			
25								
30								

Notes:
1. Groundwater observed at a depth of 10' during drilling.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

Tighe&Bond
Engineers | Environmental Specialists

Project: Bicentennial Park Seawall Investigation
Location: Hampton, NH
Client: Town of Hampton

Boring No. **B-2**
Page 1 of 1
File No. H-1800-1
Checked by: D. Brogan

Drilling Co.: New England Boring Contractors
Foreman: M. Soucy
T&B Rep.: T. Donovan
Date Start: 10/13/16 End: 10/13/16
Location See Exploration Location Plan
GS. Elev. 13.3 Datum: NAVD88

	Casing	Sampler
Type	HW	Split Spoon
I.D./O.D.	4"/4.5"	1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Other		Safety Hammer

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time
See Note 1				

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1/17	0-2	2-2	Loose, tan to brown, fine SAND			
				4-6				
		S-2/5	2-4	13-9	Medium dense, brown, fine SAND, trace Gravel			
				7-4				
5						SAND		
		S-3/11	9-11	9-5	Medium dense, brown, fine to medium SAND, trace Gravel		1	
10				5-6				
		S-4/0	14-16	9-8	No Recovery			
15				7-9				
						17.5'		
		S-4/1"	19-21	3-3	Loose, dark gray, GRAVEL and SILT & CLAY, trace fine Sand	GRAVEL and SILT & CLAY		
20				6-7				
						22.5'		
		S-5/16	24-26	17-15	Dense, orange-brown, fine SAND and SILT	SAND and SILT		
25				23-31				
						27.5'		
		S-6/2	29-29.2	50/2"	Dark gray, GRAVEL, some coarse Sand, trace Silt & Clay	GRAVEL		
30					Bottom of Exploration at 29.2'			

Notes:
1. Groudnwater observed at a depth of 10' during drilling.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

Tighe&Bond
Engineers | Environmental Specialists

Project: Bicentennial Park Seawall Investigation
Location: Hampton, NH
Client: Town of Hampton

Boring No. B-3
Page 1 of 1
File No. H-1800-1
Checked by: D. Brogan

Drilling Co.: New England Boring Contractors
Foreman: M. Soucy
T&B Rep.: T. Donovan
Date Start: 10/13/16 End: 10/13/16
Location See Exploration Location Plan
GS. Elev. 3.6 Datum: NAVD88

	Casing	Sampler
Type	HW	Split Spoon
I.D./O.D.	4"/4.5"	1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Other		Safety Hammer

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time
See Note 1				

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec. (in)	Sample Depth (ft.)	Blows Per 6"	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1/10	0-2	2-3	Medium dense, light gray, fine SAND		1	
				8-21				
		S-2/8	2-4	4-4	Loose, brown, medium to coarse SAND, some Gravel	SAND		
				3-4				
5								
						6.5'		
						SAND and SILT		
		S-3/10	9-11	5-5	Medium dense, dark orange-brown, fine SAND and SILT, little Organics			
10				6-7				
						12.5'		
						Silty CLAY		
		S-4/10	14-15.3	7-9	Light gray, Silty CLAY, little Gravel, little Organics, trace fine Sand			
15				50/3"		15.3'	2	
						BEDROCK		
		C-2/60	17-22		Hard, very slightly weathered, slightly fractured, gray, fine grained SCHIST, shallow to moderately dipping joints			
20								
					RQD = 82%			
					Bottom of Exploration at 22'			
25								
30								

Notes:
1. Groundwater observed at a depth of 1' during drilling.
2. Split-spoon refusal at 15.3'. Drilled approximately 2' into rock before beginning rock core. Cored bedrock from 17-22'.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

Dr. DAVID GRESS, Ph.D.,
Consulting Engineer
14 Sewall Road
Portsmouth, New Hampshire 03801
603-661-0121

November 1, 2016

Mr. Duncan Mellor, P.E.
Principal Coastal Engineer
Tighe & Bond
177 Corporate Drive
Portsmouth, NH 03801

Re: Hampton Sea Wall
Dear Mr. Mellor:
As per your request and authorization I have completed the evaluation and testing of the Hampton Sea Wall concrete cores. The report follows:

Laboratory Testing

Two cores and various pieces of core borings were pickup at the offices of Tighe & Bond located at 177 Corporate Drive, Portsmouth, New Hampshire. Figure 1 shows the original concrete after it was coated with a low viscosity clear epoxy and wrapped in plastic wrap to assure penetration. This core was impregnated with epoxy to assure it would hold together when cut and polished for laboratory investigation. Several miscellanies pieces of the old concrete are shown in Figure 2. Figure 3 shows a core with both the old concrete on the left end as well as the overlay concrete on the right side.

Petrographic analysis

The epoxied core of the original concrete was cut and polished for viewing under a binocular microscope. Figure 4 shows the polished section. The aggregate is a gravel from a glacial deposit as noted by the rounded particles. The aggregates are mostly igneous and very siliceous

ATTACHMENT C

in nature. The maximum aggregate size is approximately 1". The aggregate size distribution is well distributed and as placed the concrete appears to have been of reasonable quality well compacted with no signs of bleeding. There are significant cracking throughout the section with massive deposits of gel within the paste as well as the aggregate. Several aggregate particles are literally jacked apart showing massive expansion has occurred within the concrete. Such expansion is consistent with Alkali Silica Reaction (ASR). Several reaction rims, often related to the leaching of Silica from the aggregates at the paste aggregate interface, are visible. This is another potential sign of ASR. This concrete is extremely distressed.

The old and original concrete interface is shown on Figure 5. The older concrete is on the top of the polished section. There are no apparent signs of ASR in the older concrete or the overlay. It was surprising that the bond between the old and overlay concrete was intact! This may be an anomaly and exists intact only at this particular location. It is likely the stress caused by expansion of the old ASR concrete was dissipated by adjacent cracks. The overlay concrete is also a glacial aggregate but has been processed by crushing as noted by its high angularity. The mineralogy appears also to be igneous in nature and siliceous as well. The maximum aggregate size is approximately ¾". The aggregate size distribution is reasonably good. There are no tell tail observations indicating the concrete was not of good quality when placed.

Uranyl Acetate Dihydrate viewed under UV light

Alkali silica reaction produces a gel rich in silica. A test used to visually identify silica gel was conducted on a cut but unpolished section. The section tested was the mirror image of the polished section presented in Figure 4. The selected cut section was coated with a solution of Uranyl Acetate Dihydrate then viewed under ultraviolent light. If present the silica in ASR gel glows greenish-yellow under the presence of ultraviolent light.

Figure 6 shows the cut section coated with a solution of Uranyl Acetate Dihydrate under ultraviolet light (see left photograph). For comparison the polished mirror image is shown on

the right side of the photographs. The greenish-yellow glow shows the presence of ASR gel. The gel appears to be everywhere throughout the section. The gel is apparent between cracked aggregate particles and within the paste. This is a classic case of ASR.

Summary and Conclusions

Testing of the Hampton Sea Wall original concrete showed the presence of classic ASR. The concrete is extremely distressed as shown by the single core evaluated. Visually the core of overlay concrete did not appear to have any materials relayed distress and seems to have had reasonable quality when placed.

It is recommended any proposed repair of the Hampton Sea Wall not structurally rely on the use of the old ASR concrete. Trying to bond to or structurally attach to this ASR concrete is not recommended. On the other hand, enveloping the old concrete with an independent structural skin is highly recommended as a viable method of economically extending the life of the Hampton Sea Wall.

Respectfully submitted,

David Gress

Figure 1 Hampton Sea Wall original concrete core after coated with clear low viscosity Epoxy

Figure 2 Hampton Sea Wall original concrete core pieces

Figure 3 Hampton Sea Wall concrete core with old concrete (left side) and overlay concrete (right)

Figure 4 Hampton Sea Wall original concrete cut and polished section

Figure 5 Hampton Sea Wall cut and polished section showing old (top) and overlay concrete (bottom)

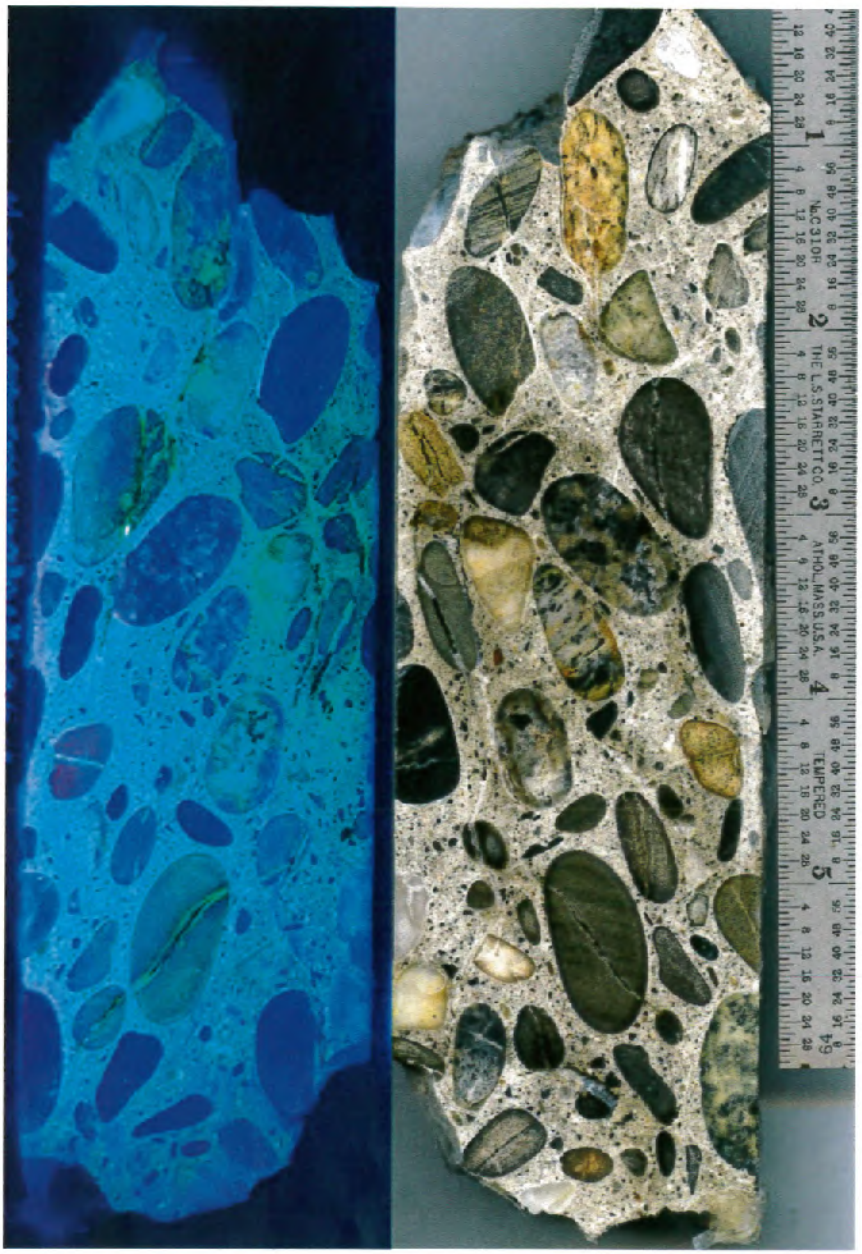
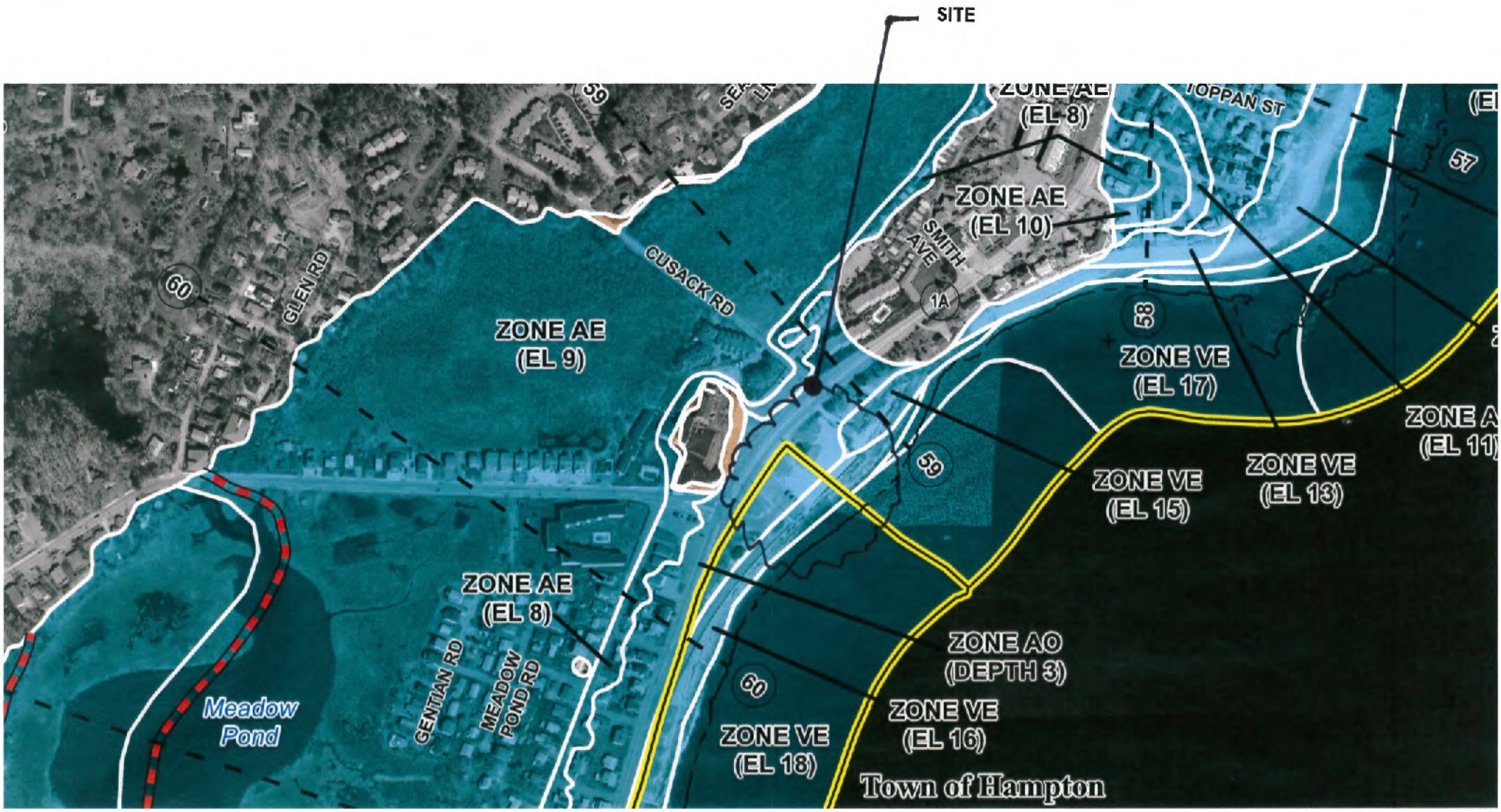


Figure 6 Hampton Sea Wall original unpolished concrete coated with Uranyl Acetate and under Ultraviolent Light (see left side). Right side is polished mirror image under normal light



ATTACHMENT D

ATTACHMENT E

Bill Doucet

From: Marc Jacobs <jacobs2wetsoil2004@yahoo.com>
Sent: Saturday, October 08, 2016 11:02 AM
To: Bill Doucet
Cc: Steve Michaud
Subject: Bicentennial Park in Hampton, NH

Hello Bill,

It was a pleasure catching up w/u yesterday at the above-referenced location. I offer the following preliminary observations and comments regarding my site investigations.

Solid color pink pin flags were placed within the boulder slope. They are consecutively numbered 1-4. They represent the Highest Observable Tide Line (HOTL).

I indicated the estimated HOTL on the seawall in white spray paint in 4 locations (about half way up the wall from the base) but it is my understanding that you will also 'carry' the HOTL from the aforementioned flags along the seawall. The seawall is nearly vertical so you could hold the base of the wall but surveying the white painted lines or carrying the line from the pink flags will be more accurate.

Please be advised that there is a significant community of American beach grass (*Ammophila breviligulata*) along the road (between the road and the beach volleyball net). Beach grass is considered dune vegetation as per Env-Wt 101.37. For this reason, any project that proposes to alter this area may be classified as a major project as per Env-Wt 303.02(a) because it may be considered sand dune. I understand that you located the edge of the beach grass community. I note that the beach grass community is being adversely affected by an indiscriminate foot path as well as a lack of fencing or similar means of pedestrian traffic control.

Please contact me with any questions or if you require additional information or any permitting assistance going forward.

Marc Jacobs
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